

# Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/006789

International filing date: 03 March 2005 (03.03.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US  
Number: 60/549,935  
Filing date: 05 March 2004 (05.03.2004)

Date of receipt at the International Bureau: 18 April 2005 (18.04.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland  
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1305160

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

*April 06, 2005*

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.**

**APPLICATION NUMBER: 60/549,935**

**FILING DATE: *March 05, 2004***

**RELATED PCT APPLICATION NUMBER: *PCT/US05/06789***



Certified by

Under Secretary of Commerce  
for Intellectual Property  
and Director of the United States  
Patent and Trademark Office

Please type a plus sign (+) inside this box Approved for use through 4/30/2003. OMB 0651-0032  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE  
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

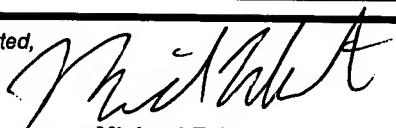
This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

22154 U.S. PTO  
60/540935

INVENTOR(S)					
Given Name (first and middle [if any])		Family Name or Surname		Residence (City and either State or Foreign Country)	
Pablo M. Jeffrey H.		Robert Reed		Blacksburg, Virginia Blacksburg, Virginia	
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
NON-CENTRALIZED CHANNEL STRUCTURES FOR MIDDLEWARE					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input checked="" type="checkbox"/> Customer Number		30743		<div>Place Customer Number Bar Code Label here</div>	
OR Type Customer Number here					
<input checked="" type="checkbox"/> Firm or Individual Name		Michael E. Whitham			
Address		whitham, Curtis & Christofferson, PC			
Address		11491 Sunset Hills Road, Suite 340			
City		Reston	State	Virginia	ZIP 20190
Country		US	Telephone	703-787-9400	Fax 703-787-7557
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification		Number of Pages		<input type="checkbox"/> CD(s), Number	
		2			
<input type="checkbox"/> Drawing(s)		Number of Sheets		<input type="checkbox"/> Other (specify)	
		0			
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)	
<input checked="" type="checkbox"/> A check or money order is enclosed to cover the filing fees					
<input checked="" type="checkbox"/> The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number		50-2041		\$80.00	
<input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.					
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

Respectfully submitted,

SIGNATURE



TYPED or PRINTED NAME Michael E. Whitham

TELEPHONE 703-787-9400

Date 3/5/04

REGISTRATION NO. 32,635

(if appropriate)

Docket Number: 01640453PR

**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Provisional Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



030504

13281 U.S. PTO

## NON-CENTRALIZED CHANNEL STRUCTURES FOR MIDDLEWARE

The invention is a different method to implement object brokering to tie together different software objects (through middleware).

In the implementation of SCA (software communications architecture)-compliant software-defined-radio (SDR), a military standard, data channels are necessarily directed through CORBA, which is a separate process residing in a general-purpose-processor (GPP). A separate channel, under the control of the CORBA ORB or some other middleware, is established between two objects that require a connection. This separate channel can take the form of shared memory between two objects in separate threads within the GPP or some other form of direct channel. By bypassing the ORB( or some other form of middleware) through this channel, several benefits can be reaped:

- highly efficient connection
- easy upgrade path (supported by middleware)
- complements refined software radio design methodology (supports easy partitioning of functionality)
- easier integration of reconfigurable computing platforms
- allows the direct connection of different platforms with little GPP overhead
- isolates reconfigurable computing modules
- eases integration of different reconfigurable computing platforms
- extension of middleware connections outside GPP allows for efficient embodiment of customized connectivity approaches (switching fabrics)
- eases restrictions required to support power management
- eases integration of ASICs cores into system design
- eases development

Increases scalability of design (by reducing the impact of the GPP bottleneck)

Examples of such functionality can be implemented through strategies such as director memory access or a shared bus.

All current implementations of middleware are designed explicitly to isolated different objects from each other, and, hence use a centralized form of control. By extending the functionality of the middleware into the interface of each of these objects and establishing a

separate (but controlled) data channel, this middleware concept should be far better suited for SDR applications.

This invention significantly reduces the overhead inherent to the implementation of middleware (like an ORB) while at the same time maintaining full compliance with the software designed to use the middleware (like the SCA). It has been shown that an SCA compliant waveform, as much as 76% of the system resources are occupied by the overhead incurred by the middleware. This concept is specifically designed for software-defined-radio implementations, but with the SCA specifically in mind. All new military communications hardware transmitting in channels above 2 GHz are required to use this standard.